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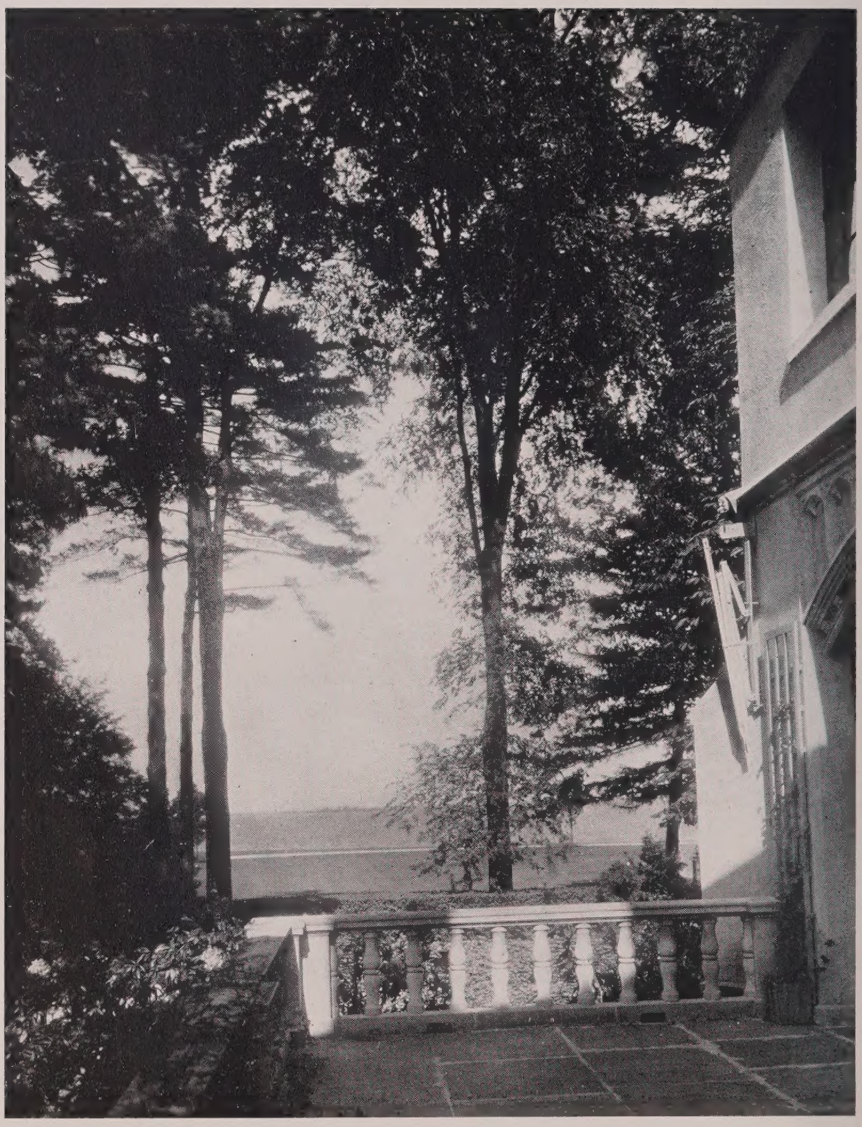


A Beautiful Vista.

(See page 16.)

Editorial

TREE TALK comes out for the fall season with an offering which we trust you will appreciate. The first article is a decided innovation, being in the nature of an illustrated article by the eminent mycologist, Prof. H. M. Fitzpatrick of Cornell University. In it the various wood destroying fungi are discussed. You will recall Prof. Fitzpatrick as being the author of "Mushrooms on Trees" appearing in the Autumn, 1926, volume of TREE TALK. The essentials for the training of a tree expert are briefly outlined on page 11. Dr. E. P. Felt has another timely article on "Insects and Trees". The art (and it is an art) of vista cutting is taken up by a Bartlett Associate, W. B. Mix. Fresh from Japanese beetle headquarters at Riverton, New Jersey comes an article from the pen of Dr. Loren B. Smith, the man who knows all there is known about the Japanese beetle. Prof. J. A. Cope, extension Forester of Cornell University, has written a very comprehensive article on "Taking the Evil out of the White Pine Weevil", amply illustrated. From the research department of the Bartlett Associates comes an article on Black Cup Fungus of Oaks caused by Bulgaria polymorpha. It is by Dr. W. Howard Rankin. Mr. George A. Cromie, city forester of New Haven describes a visit to the Bartlett plant which we pass along to you with a cordial invitation to visit us also.

Heart-Rot of Shade Trees

By H. M. Fitzpatrick

Professor of Mycology, Cornell University

THE decay of the heart-wood of trees is so common a phenomenon in nature that it has come to the personal attention of all of us. Perhaps some of the unthinking have regarded it as one of the consequences of old age, to be expected and not to be avoided. Possibly even some of those readers who realize fully that heart-rots are caused by the ravages of fungi will not be aware that different fungi cause different types of decay, and that these may be distinguished from one another by the expert or experienced observer. In this article several different characteristic rots are figured, and the fungus responsible in each case is pictured and discussed.

A microscopic examination of decaying wood reveals an abundance of branching threads of the fungus termed mycelium (Fig. 4). These threads are the food-producing organs of the fungus and are thus analagous to roots. They excrete solvents (enzymes) which tend to break down the wood elements, which serve the fungus as food. In time the wood may be completely destroyed. The mycelium meanwhile spreads through the wood, increases in amount, and accumulates reserve food for the development of its fruiting or reproductive stage. At some point on the surface of the tree where a wound occurs and the heart-wood is exposed to the air, the mycelium masses itself and develops the fruit-bodies. These structures are extremely various in size, color and shape in the different heart-rot fungi, but for each species the fruit-body is definite and characteristic. In some forms (Agaricaceae) examination of the lower surface reveals the presence of radiating flat knife-blade like plates (gills) such as occur in the toadstools. On the surface of these gills the countless microscopic spores which are comparable to seeds are produced. However, the majority of heart-rot fungi belong to another group (Polyporaceae) and develop their spores inside of cylindrical tubes instead of on the surface of gills. These tubes stand parallel in the vertical position and form a continuous layer on the under side of the fruit-body, their open lower ends appearing as pores (Fig. 5). The spores fall from these tubes, when ripe, and float about in the air. On the surface of wood, under favorable conditions of moisture and temperature, they germinate and develop the mycelium.

Many other fungi which form neither gills nor tubes are found on bark or wood. Some of these develop noticeable and characteristic fruit-bodies. A few of them are well known heart-rot organisms. Others cause decay in the sap wood or bark.

Not all of the fungi which cause decay in wood are capable of attacking that of living trees. Many are restricted to dead standing timber or occur in fallen trees, logs, stumps, or lumber.

The most virulent organisms, on the other hand, are unable to gain a foothold in a dead tree or are only found entering living trees through wounds. These have been called "wound parasites" and in some of them the mycelium may become truly parasitic. After the heart-wood is affected and the mycelium becomes well established in the tree, it may gradually encroach on the living sap wood just beneath the bark. Thus not only is the tree weakened by the rotting of the heart-wood, but also by the destruction of the living wood. The branches in the top of the tree then begin to die and complete girdling may kill it outright.

If the mycelium gains entrance to the tree through a small opening, the latter may be healed over and the fungus be completely hidden for years. Meanwhile it may rot the entire heart of the trunk and main branches. Finally a branch is broken off by the wind or a wound occurs and the fruit-bodies are then formed on the exposed surface. Thus, these structures, while sinister in aspect, occur only after the harm is done. In fact, they may even prove of some service since they make more easy the iden-

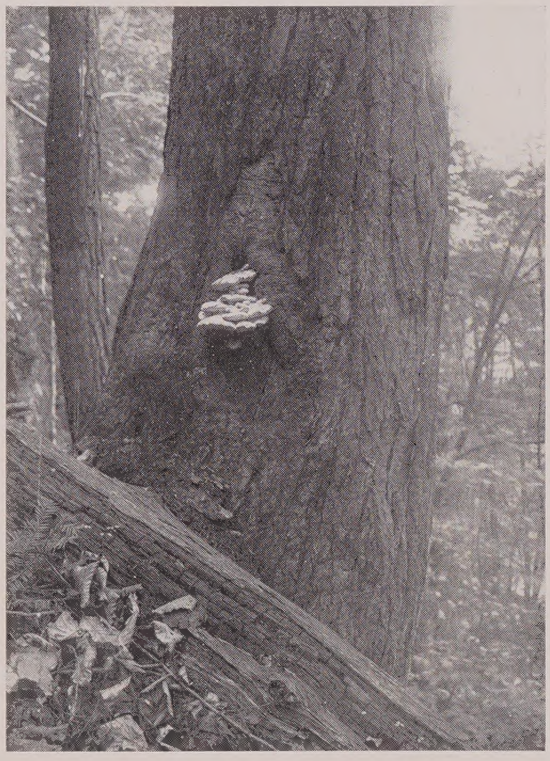


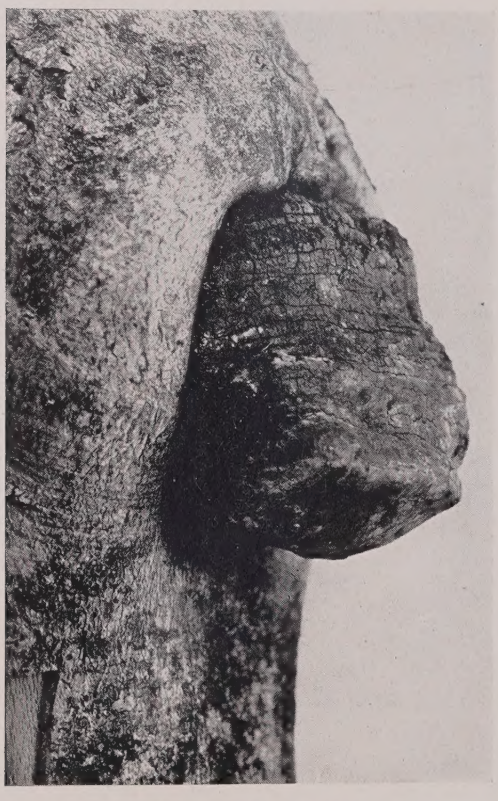
Photo by Atkinson.

FIG. 1.—"A Woodland Tragedy"—Fruit-bodies of a parasitic fungus, *Polyporus borealis,* arising from the exposed heart-wood at the center of an old wound on the side of a giant hemlock.

The prostrate rotten log in the foreground tells the story. Years before, the trunk of this fallen tree struck the other as it fell, tearing from its side a great strip of bark and cambium, and exposing the heart-wood. The prominent callous at the margin of the wound is evidence of the valiant though unsuccessful attempt made by the tree to heal the wound. The exposed heart-wood, susceptible to the attack of fungi, did not escape. Spores of a "wound parasite" floating in the air fell on the exposed surface, germinated, and sent the destructive mycelial threads into the wood. These fed on the heart-wood and caused its rapid decay, probably for a number of feet upward and downward in the trunk. In time the weakened tree will break over and fall during a wind storm. The fruit-bodies of the fungus are borne year after year on this wound or on others on the tree. They produce myriads of microscopic spores which drop from the pores on their lower surface and float about in the air carrying destruction elsewhere.

tification of the fungus involved and tell us whether it is of moderate or exceptional virulence. Removal of the fruit-body will aid somewhat in reducing the likelihood of infection elsewhere, but will prove of no value to the tree which bore it. Only by careful pruning and proper disinfection of all exposed surfaces will heart-rot in shade trees be avoided. Prevention is better than attempted cure, but if decay gains a foothold the diseased portion of the tree should be promptly removed and the cut surface properly treated.

The following pages illustrate more fully and interestingly many of the wood rotting fungi than would be possible by word pictures only.



1/3 actual diameter. *Photo by W. R. Fisher.*

FIG. 2.—Hoof-shaped fruit-body (sporophore) of *Fomes igniarius* protruding from a knot-hole on the trunk of a beech tree.

The fruit-body usually has this shape, is very hard and so characteristic in aspect that it is not likely to be confused with other fungi. Large specimens sometimes attain a foot in diameter. The upper surface is black with alternating ridges and furrows, and is usually prominently marked with numerous small cracks running in both directions, the surface having consequently a weathered aspect. The lower surface is brown and is covered with minute pores, the mouths of cylindrical tubes. These tubes form a definite stratum about ¼-inch thick and in them the spores are formed. A new tube layer is produced each year below that of the preceding year, the fruit-body of *Fomes* being perennial. In longitudinal section the fruit-body is brown, the tube layers are only indistinctly demarcated, and minute flecks of white scattered through the older layers are characteristic of the species. The fungus occurs on many species of deciduous trees in the northern United States and is one of the most important wound parasites in our hard wood forests.

½ actual diameter. *Photo by Atkinson.*

FIG. 3.—Cross-section of the trunk of a young maple badly decayed by *Fomes igniarius.*

This fungus causes a definite type of rot rather easily recognized by the expert. The narrow black lines visible in the section are more often seen in this rot than in any other and mark the advancing waves of decay. The mycelium of these heart-rot fungi advances rapidly under favorable conditions, but at other times may lie quiescent. The decay may spread irregularly, approaching much more closely to the bark on one side or in one spot than at another. The mycelium of this species feeds on the lignin in the wood, leaving the cellulose. The material which gives wood its distinctive hardness is thus removed and a light, soft, punky tissue remains. Definite cavities such as result from the attack of a fungus with a less particular taste are not formed.

Magnified 112 diameters. *Photo by W. R. Fisher.*

FIG. 4.—Mycelium of a heart-rot fungus, *Pleurotus ulmarius,* in the wood of elm.

The mycelium of fungi comes into existence when the tiny spore analagous to the seed of a higher plant germinates to form a cylindrical tube. This tube elongates and branches and soon a complicated system of branching threads results. Here these threads are seen penetrating normal wood tissue in the early stages of decay. The prominent spindle-shaped areas of wood cells are sections across the medullary rays that radiate from the pith to the bark. The mycelium shown here has been darkened with a stain.

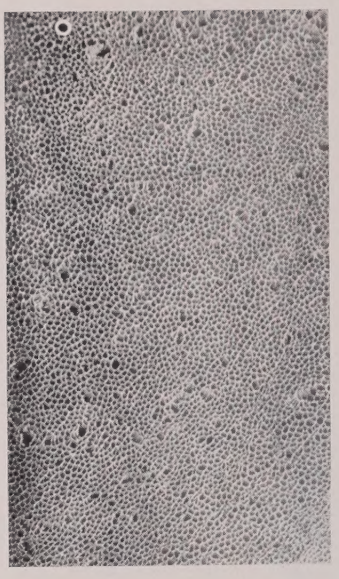
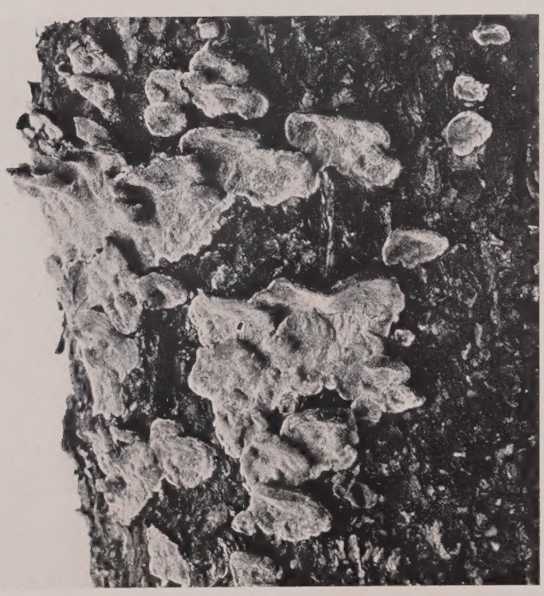


Fig. 5.—Portion of the under surface of the fruit-body of *Polyporus resinosus,* magnified slightly to show the mouths of the tubes.

Lining the walls of these tubes are microscopic club-shaped basidia, each bearing 4 microscopic spores. The spores fall off when ripe and float away in the air, countless thousands being produced in every fruit-body.



About ½ actual diam. *Photo by W. R. Fisher.*

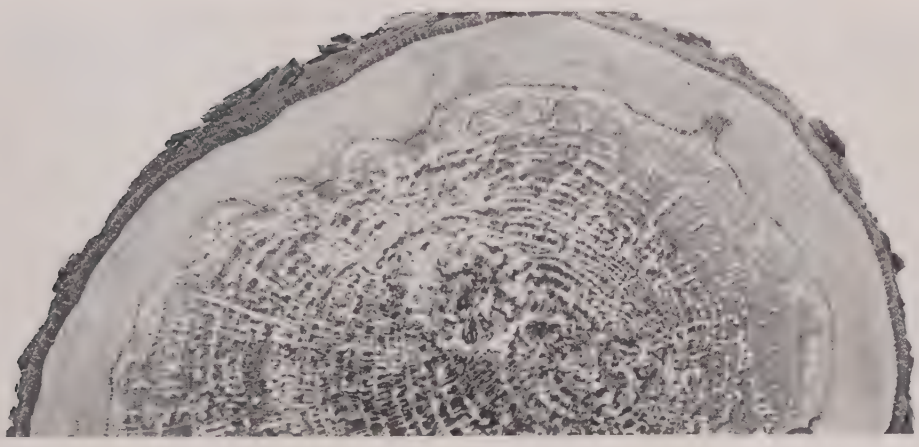
Fig. 6.—Fruit-bodies of another important parasitic polypore, *Fomes pini,* on bark of red spruce.

The individual fruit-bodies of this species are relatively small and thin, and are extremely variable in form. The upper surface is often inconspicuous, while the lower spreads down the side of the tree and catches the eye. The upper surface is red brown and somewhat velvety; the lower, yellow brown with rather large pores. The species is common in the northeastern United States on soft-wood trees, especially spruce and balsam. It causes a very destructive and characteristic rot.

Natural size. *Photo by W. R. Fisher.*

FIG. 7.—Trunk of red spruce decayed by *Fomes pini.*

The wood is dotted with little pockets or cavities packed with the white mycelium of the fungus. This condition has been termed "partridge wood."



½ actual diameter. *Photo by Atkinson.*

FIG. 8.—Heart-rot in white oak caused by *Polyporus sulphureus.*

This section cut near the base of the trunk shows well the outstanding characteristics of the rot caused by this fungus. The decayed wood undergoes shrinkage, cracks and breaks up into small cuboidal pieces. The mycelium then grows out into these crevices and fills them with a white felt-like mat of threads. In a longitudinal section flat mats of considerable extent are revealed.

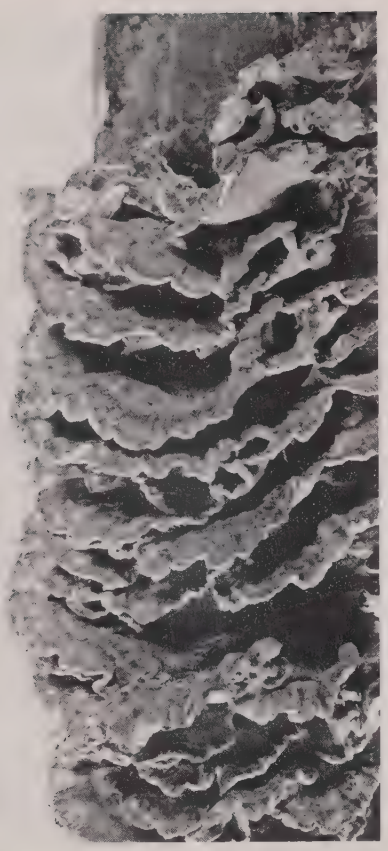
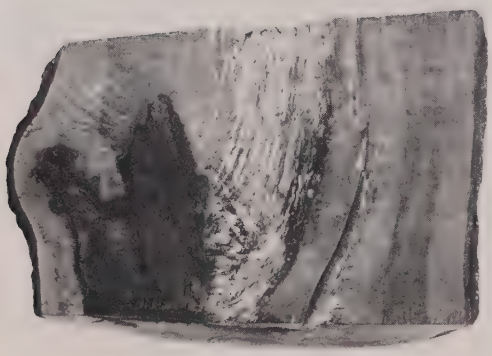


Fig. 9.—Imbricated (overlapping) fruit-bodies of *Polyporus sulphureus* on the side of a tree.

The "sulphur polypore" is so striking and characteristic in color that once seen it would not be mistaken for any other. The upper surface is bright orange; the lower, sulphur yellow. A number of shelving fruit-bodies are aggregated, one above the other, to form tubercular masses often a foot in diameter. The fungus is parasitic on both deciduous and coniferous trees and is found fruiting on dead as well as living individuals. The fruit-bodies, when young, are soft, fleshy and edible. When old, they fade in color, become tough, and finally decay. New fruit-bodies are formed each year, the sporophore of *Polyporus* not being perennial as in *Fomes*.



¼ actual diameter. *Photo by Atkinson.*

Fig. 10.—Longitudinal section of trunk of white oak showing a central core of decayed tissue resulting from the attack of *Polyporus sulphureus*.

This section was cut from the same tree as that shown in Fig. 9, and lay several feet higher in the trunk. The blackened tissue embedded here is of exceptional interest. Some 30 years before the tree was cut, and while it was still a mere sapling, the entire top was broken off. One of the topmost branches grew up, became the "leader" and in time replaced the main trunk. The jagged end of the latter then took a lateral position. The tree attempted to heal the wound which it had suffered, but the protruding stub made this well-nigh impossible. The spores of fungi fell on the weathered exposed surface, caused the decay of the stub, and the mycelium passed down through it into the heart of the tree. The rot spread up and down in the tree as evidenced by the condition as shown in Fig. 9. Meanwhile, as the tree increased in diameter the stub was slowly enveloped until at last it was completely enclosed in the healthy tissue. When the tree was cut it gave no external evidence of its decayed and weakened condition. Had the protruding stub been properly pruned away and treated the tree would doubtless have escaped decay entirely.

The Training of a Tree Expert

By Theodore Reuman

IT was not so many years ago that the training new men received in the field was that obtained from those already on the job. This training was more or less "hit and miss" as most of the tree experts, although good workers themselves, were notoriously poor in transmitting their knowledge to others.

The larger tree expert companies were not slow to realize the necessity of giving their own men the same technical training received in other lines in the better vocational and scientific schools, if they were going to have the trained men required in this new and developing profession. During the past few years, therefore, these organizations have maintained their own schools, with competent educators in charge where the definite instruction is given the men who wish to become real tree experts.

Prescribed courses of study have been laid out and definite subject matter is taught. A tree expert must not only know the mechanics of his work, but he must have an intelligent foundation and knowledge of the subjects allied to the care and preservation of trees.

He should know something of entomology, that science which deals with the life history of insects and how controlled; he should know his botany, something of plant pathology, and, of course, much about tree diseases and silviculture. The feeding of trees is important and this involves at least some knowledge of agronomy and fertilizers. Spraying for the control of insects and fungi is necessary and this presupposes a knowledge of insecticides and their use.

The recognized Schools, such as the Bartlett School of Tree Surgery, give at least a two years' course where this necessary foundation can be obtained. The more extensive these Schools become and the more carefully the curricula are developed, the better will be the training of the tree experts in the field. With a still greater knowledge of their subject, the tree experts can raise the standards still higher and themselves to a level of greater usefulness and success.

Insects and Trees

By E. P. Felt, *State Entomologist of New York*

THERE have been a number of unusual outbreaks of destructive insects in woodlands during the last thirty years. It is difficult to fight pests economically under forest conditions and a consideration of the causes producing these depredations may be of great service in lessening damage in the future, in the same way that an inquiry as to the origin of fires tends to reduce losses through that agency.

One of the most conspicuous types of damage caused by forest insects is the defoliation of extensive areas, such for example, as the stripping of woodlands by the forest tent caterpillar from 1897 until 1900, similar work by the looping caterpillars of the snow white linden moth in some areas and by the green striped maple worm in others about 1907, and by the green maple worm on soft maples in 1898 and again in 1911. It is obvious that climatic conditions, favorable or unfavorable to these leaf feeders, would very likely react in much the same manner upon other insect enemies and consequently one is inclined to look elsewhere for explanation of these unusually extended and frequent strippings of woodlands. Invstigations conducted some years earlier by Doctor William T. Hornaday of the New York Zoological Garden, disclosed a reduction of approximately forty-eight per cent in the bird life of the country and, as a number of our native birds are very effective checks upon leaf feeders, it appears very probable that this one factor of itself may have had an important bearing upon the unusual abundance of insects mentioned above.

OUTBREAK BY THE HICKORY BARK BORER

There was an outbreak by the hickory bark borer in central New York in 1898, and ten years later there were serious losses from the same cause in the vicinity of New York City. An examination of weather records for the central part of the state showed a marked reduction in rainfall for at least two years prior to these unfortunate developments, while in the vicinity of New York City the data revealed a total deficiency in precipitation from 1906 to 1912 of 28.56 inches, there being in the year 1910 only about one-fifth the usual rainfall. These factors suggest, though by no means prove, the close connection between a reduced rainfall and presumably lowered vitality of the trees and injury by borers, which is further supported by the fact that many hickories standing in well watered situations or amid surroundings where there was a vigorous growth escaped with practically no injury by these pests.

There is also another factor which enters into the situation, namely the destruction or waste, usually unintentional, of the valuable humus so essential to the conservation of moisture and the growth of many forest trees. This is particularly noticeable on large estates near cities where wood-

lands are so thoroughly cleared up that there is no small brush or other low plants to hold the leaves and other humus forming materials and consequently the vegetable matter dries up, crumbles and is speedily scattered by the winds during dry periods. Many costly dwellings are built in woodlands or near to magnificent trees and then the conditions so changed that the trees gradually lose vitality and succumb to drought or the work of insect pests.

It is axiomatic that a vigorous, healthy growth is unfavorable to insect depredations, and generally speaking this is true, though this must not be construed too literally in the case of leaf feeders. It also follows that a departure from normal conditions reacts upon the development of the plant and may result in a series of disturbances which may end in a very unsatisfactory condition and possibly serious damage by insects.

PRESERVATION OF BIRD LIFE

There is no practical method open to the individual for the preservation of bird life or the averting of drought and its evils, except within comparatively narrow limits. Some of our bird lovers have demonstrated the practicability of attracting birds to restricted areas and keeping them there by providing favorable conditions. This simply means attracting the bird life from adjacent territory and while it may result in some increase in their numbers, the effect as a whole is comparatively small. There is great need of a more general appreciation of the important part birds play in the control of insect pests, particularly the woodland species, and the public should be educated to protect all such forms if we would avoid more serious losses in the future.

The amelioration of drought, like the protection of birds, is a problem better fitted for the community or state action than for the individual. The increasingly severe droughts of recent years have an intimate relation with earlier and irresponsible stripping of forests from hills and mountains and their use as somewhat unsatisfactory pasture, with a consequent reduction in forest areas and their water-holding, sponge-like humus, the latter having a most important function in retaining rainfall and releasing it gradually over an extended period. The comprehensive and intelligent reforestation of the less productive farm lands would do much to reduce the severity of droughts with their attendant losses not only to forests but also to crops, many of them of much greater value than was the case a few years ago.

CONSERVATION OF HUMUS

The conservation of humus, the maintenance of natural conditions for forest areas on estates and parks, is a line of effort which can be followed to great advantage, even on small areas. The fundamental in the care of forest trees is to maintain natural conditions so far as possible and if a matting of low brush of various kinds can be allowed to remain in the woodlands, the conservation and maintenance of humus is very largely automatic. Where this is impossible or where such methods have not been practiced in the past, there is probably great need of replenishing the humus in the soil and making provisions for its retention by the planting, so far as practicable, of small shrubs or other plants which will assist in keeping

this essential vegetable matter where it falls. We venture to suggest that a policy dictated by a realization of the necessity of humus for the growth of trees would do much to maintain the health and vigor of many trees in parks or on estates. There are in this country a number of parks where natural conditions are unchanged and practically with little interference in the availability of the park areas for recreation purposes. It may not be possible to carry out this idea in its entirety in the case of the more centrally located and small city parks, though it may be feasible to surround trees or groups of trees with the necessary undergrowth and where this is impracticable, there should be a systematic addition of humus from year to year if one would secure the best results.

Acid Soil For Rhododendrons

A GREAT many people have difficulty in growing Rhododendrons successfully. Most of our ornamental plants prefer an alkaline soil and therefore most lawns and shrubs receive lime at intervals in order that they may thrive. This, however, does not apply to the Rhododendrons and a few other plants which are quite the opposite in taste and prefer an acid soil and will not thrive in lime-stone soil. Experiments have been carried out by Dr. Frederick V. Coville, botanist of the U. S. Department of Agriculture, and he has discovered that this acid condition of the soil may be artificially obtained by the use of aluminum sulphate. All are more or less familiar with the fact that Rhododendrons generally do well in peaty soil where an application of leaves are added regularly and allowed to decay. This is doubtlessly due to the fact that a certain amount of fermentation sets in, resulting in the acidity which Rhododendron desires as well as to the portion of the surface roots from the drying action of the sun.

Dr. Coville has found that with Aluminum sulphate at the rate of about one-half lb. to the square yard in ordinary soil for Rhododendrons will greatly invigorate them. He does not recommend that all rhododendrons should receive this treatment as it is more or less in the experimental stage, but results so far have been strongly in favor of such treatment.

We would recommend that individual plants that are not doing well receive such an application, spread broadcast over the surface of the ground, not within 12 inches of the main stem and out to extent of the branches. It is very probable that other plants might be equally benefited by this treatment, such as blue-berries which are often removed from swamps and planted as ornamentals, but which until recently have not seemed to enjoy domestic surroundings.

Trees

By Irene Maunder

The poplar is a soldier,
  The beech tree is a queen,
The birch, the daintiest fairy
  That tripped upon a green.
But there are only two trees
  That set my heart astir,
They are the drooping larch tree
  And the rough Scotch fir.

The oak tree tells of conquest
  And solid, dogged worth.
The elm of quiet homesteads
  And peace upon the earth.
But oh! my love and lady,
  Just two trees speak of her,
They are the swaying larch tree
  And the rough Scotch fir.

They speak of shady woodlands,
  They tell of windy heath,
Of branches spread above us
  And crackling cones beneath.
And oh! I fain would wander
  Where once I went with her,
Beneath the golden larch tree
  And the rough Scotch fir.

The ash is bent with weeping,
  The cypress dark with doom,
The almond tree and hawthorn
  Are bright with hope and bloom.
But there are only two trees
  That set my heart astir,
They are the swaying larch tree
  And the bleak Scotch fir.

The Art of Vista Cutting

By W. B. Mix

NATURE in her task of creating views can often be helped along with the aid of man's knowledge and skill. In the normal order of cloaking the countryside Nature has always created choice bits of scenery to be viewed by man from special vantage points. We all have our choice halting places when climbing mountains and hills where we pause awhile to refresh ourselves by enjoying the expansive and varying vistas. Some vistas extend for many miles to distant mountain peaks, others are close up vistas with cooling waters tumbling merrily over the rocks as the vista objective.

There are vistas and vistas, no two being alike, and can be found the world over. There are vistas from boats towards land with cozy villages and snug harbors prettily framed by the sails and rigging; in turn there are vistas from land with ships as objectives.

People living in closely confined areas are able to enjoy miniature vistas in their backyard gardens. Quite frequently other woodland loving persons build their homes in wooded areas completely closed in by a dense cover of trees and thicket. No sunlight and very little air has a chance to

Before and after a well pruned vista. Note church steeple in right hand picture.

penetrate the household. After a few years the home becomes dismal, which not even bright hued paints can enliven.

Why live in such an atmosphere when a vista can be cleverly cut through the trees, under the higher limbs, or over the tops of the smaller trees. A tree specialist with a sense of beauty values can work wonders in cutting vistas in Nature's woods. Not only is this true through the woods but where trees have been too closely planted by man and have grown in size over a period of years.

The first of the photos shows how the trees completely hid what the second photo discloses after a vista had been cleverly opened through and under several trees. The little white church and steeple half a mile away make a wonderful vista picture from the porch of the home.

In cutting vistas great care has to be used in order to bring out the view and keep unsightly areas hidden. The frontispiece of this magazine shows a charming vista out over Long Island Sound from the front porch.

The art of vista cutting is the higher science of proper pruning.

Book Review

What Tree is That?

By E. G. Cheyney

EVERY lover of the outdoors likes to know on sight the commoner varieties of trees and to call them by name. He likes to answer with confidence such a question as "What tree is that?" and to feel that in his answer he has scientific support.

With these thoughts in mind E. G. Cheyney has prepared this book, and made it a convenient guide of the common trees of the United States, clear and informal in its language and simple in its plan.

The reader finds on the right-hand page a brief description of each family of trees, together with an account of its principal features, its leaf, bark and range. And on the opposite or left-hand page is pictured in outline drawing the characteristic leaf, fruit or other identifying feature of the species. A special unique index is included which enables the user to identify by the leaf the family to which the tree belongs.

No matter in what section of the United States he may be, the nature lover equipped with this handbook can recognize at a glance the trees he comes across on exploring trips into woods and fields. Mr. Cheyney is an eminent authority on wood lore and the Director of the Minnesota School of Forestry.

This book is published by D. Appleton and Co. and costs $2.00.

Japanese Beetle Control

By Dr. Loren B. Smith

NEW YORK is now held tight in the grip of a quarantine. For the first time in its history this city is feeling the effects of the activities of the New York State Department of Agriculture and Markets cooperating with the U. S. Department of Agriculture in an attempt to prevent the spread of the Japanese Beetle. The beetle has already cost this country millions of dollars and a desperate effort is being made to keep the pest from spreading to other sections where untold damage may result.

The Japanese Beetle has already been found in large numbers in all of the suburbs around New York and all of these communities are included in the quarantine area. All of New York City, parts of Westchester County in New York, the towns of Greenwich and Stamford in Connecticut and the County of Nassau on Long Island are included in the quarantine.

The beetle is particularly fond of fruits, vegetables and flowers as well as shrubs and shade trees. The quarantine prevents the carrying in cars, trucks or wagons, corn or beans to any point outside of the quarantine line without a certificate of inspection stating they are free from all beetles.

In establishing the quarantine rules and regulations, the state and federal authorities have worked out a system of inspection that allows the movement of certain crops beyond the lines if they have passed through the New York wholesole produce markets. All produce leaving the New York market is supposed to be free from beetles. With the exception of corn and beans, all farm crops and fruits can move unrestricted without a permit if they are destined for towns and cities to the east of the Hudson River. All other shipments that recross the Hudson into New Jersey and intended for points beyond the line in New York state must be reinspected and certified. This is made necessary because a large number of trucks from Southern New Jersey pass through the heavily infested beetle area near Philadelphia and on reaching the New Jersey-New York line, it is impossible for the inspectors to tell where the produce originated or whether it was being redistributed from New York. Inspection platforms have been established in New York for the convenience of shippers who do business with up-state and New England points. The principal inspection platform is located on West Street between Barclay and Park Place. The New York office is situated at 2000 Bronx Street, West Farms, New York, from which place all certificates are issued. The Connecticut Department of Agriculture is cooperating with the federal authorities and maintains an office at 682 Main Street, Stamford, Conn.

The Japanese Beetle is now one of the most destructive pests that is confronting the eastern coast states. It attacks not only farm crops but is equally destructive to country and suburban homes, destroying foliage and grass alike including roses, shade trees and flowering shrubs.

In less than ten years the beetle has spread from a 10-acre field near Riverton, N. J., to an area of 14,000 square miles, including the entire state of New Jersey, portions of Delaware, Pennsylvania, New York, Connecticut and Long Island.

Every known means to check the spread of the beetle is being used in the heavily infested areas, while near and in New York City, scouts are making a search for beetles.

These scouts are inspecting lawns, plants and trees. They are hunting through sections of the city as well as the suburban home districts and private estates. These men are invested with the authority of the Department of Farms and Markets and the U. S. Department of Agriculture to enter any property in the quarantine area in search of beetles. Home owners with shade trees, roses and flowering shrubs are asked to cooperate with these scouts in locating new beetle infestations. These men are representatives of the Federal Government and not spies for second story men, planning another robbery. Cases are on record where these scouts have had to make explanations to the police when found on private property.

The work in controlling the beetle depends on the attitude of the home owner who wants to protect his valuable plants from the attacks of this vicious pest that is proving destructive once it is firmly established in any community.

DO TREES THINK?

A Snapshot from "Ways of Nature"

Here, in front of my window, is a black raspberry bush. A few weeks ago its branches curved upward, with their ends swinging fully two feet above the ground; now those ends are thrust down through the weeks and are fast rooted to the soil. Did the raspberry bush think, or choose what it should do? Did it reflect and say, Now is the time for me to bend down and thrust my tip into the ground? * * * Or take the case of the pine or spruce tree that loses its central and leading shoot. When this happens, does the tree start a new bud and then develop a new shoot to take the place of the lost leader? No, a branch from the first ring of branches below, probably the most vigorous of the whorl, is promoted to the leadership. Slowly it rises up, and in two or three years it reaches the upright position and is leading the tree upward. This, I suspect, is just as much an act of conscious intelligence and of reason as is much to which we are inclined to apply those words in animal life. I suppose it is all foreordained in the economy of the tree, if we could penetrate that economy. It is in this sense that Nature thinks in the animal, and the vegetable, and the mineral worlds. Her thinking is more flexible and adaptive in the vegetable than in the mineral, and more so in the animal than in the vegetable, and most so of all in the mind of man.

John Burroughs.

Taking the Evil Out of the White Pine Weevil

By J. A. Cope, *Extension Forester, Cornell University, Ithaca, N. Y.*

THE intensive publicity for forest planting, broadcast all over the Northeast during the last decade, is resulting in literally thousands of hand-planted potential forests springing up on idle acres from Maine to Pennsylvania.

In this orgy of tree planting, which nevertheless is very far from keeping pace with the annual abandonment of plough land, white pine has figured largely because of its rapidity of growth and the value of its lumber. But back of these commercial aspects which give impetus to its use, there is the aura of sentiment that surrounds white pine in the Northeast as the preeminent tree of our ancestors. Even though a century of prodigal cutting had removed a large part of the virgin pine from our forests, childhood memories cling affectionately to the century old pines that still stand on guard over the homesteads of our grandsires.

A certain sense of satisfaction is justifiable in the landowner who has contributed to the welfare of posterity by setting out white pine in a forest plantation. There is real enjoyment, too, in walking through the plantation year after year noting how rapidly the trees grow.

In such a frame of mind the shock to the pine owner can well be imagined when he walks through his plantation some fine day in mid-summer to find many of those vigorous growing pine leaders drooping and turning brown.

The reaction is calculated to make him disgusted with the whole reforestation business.

DISCOVERS THE WEEVIL

The trouble, he will find on investigation, is due to little white grubs or larvae working down in the leader, eating all the tender green tissue with the consequent death of the leader. On inquiry from his county agent or the nearest forester, the owner will find that his white pine plantation is being attacked by the White Pine Weevil, a native insect, whose favorite food is tender white pine leaders. It also attacks Norway Spruce and infrequently Scotch and Red Pine. The life history of this beetle has been thoroughly worked out and those desiring the very latest technical information are referred to Bulletin 449 of the New York State Agricultural Experiment Station at Ithaca, N. Y., entitled "Biology and Control of the White Pine Weevil" by S. A. Graham.

HOW IT WORKS

Briefly the story is this. Early in the spring the adult beetles emerge from the layers of needles around the base of pine trees where they have spent the winter and with fatal accuracy fly to the leaders of young pine

trees. (No side branches for them, only the leaders will do.) Here in the cluster of buds at the tip of the leaders, the adults mate and soon the female begins her nefarious business of laying eggs in the tender tissues of the inner bark just below the cluster of buds. In two weeks or less, the eggs hatch and the larvae, with insatiable appetites, begin eating their way down the leader. If there are sufficient larvae to encircle the stem, it is inevitable that the shoot should succumb. After eating their way downwards for about 20 inches the larva has a stomach full, so to speak, and burrows into the pith to spend a fortnight or a moon, changing into an adult weevil. In the early fall the adults emerge, do a little surface feeding on buds, and then go into winter quarters. This brings us back to the starting point.

SERIOUSNESS OF THE PEST

The damage done by these larvae is serious because with the leader destroyed a side branch must take the lead, thereby developing a pronounced crook to the stem (see Figure III). More serious still, not one but often two or three laterals compete for the leadership and the result is a many forked tree utterly worthless for timber.

The damage caused by the weevil in pine plantations is very much accentuated if the plantation is on thin or poorly drained soils where the

FIG. I.—*Facts About the White Pine Weevil.*

(1) Recovery in plantation after pruning.
(2) Open grown pasture pine showing at least 3 laterals fighting for the lead.
(3) Natural recovery from 3 successive attacks in crowded stands.
(4) Average height at which pine first attacked.
(5) Control measures recommended and as carried out in No. 1.
(6) Chart showing adult weevil, and stages in the life history.

height growth is necessarily slower. On good soils it is not unusual for white pine to grow two feet in height per year; that means four inches to spare over the twenty inch average required by the larva to reach maturity. On less favorable growing sites the larva may have to eat down through not one but two or three whorls of branches (years of growth) to reach maturity, which means that the pine tree is killed back not one but three years. To take the lead the pine must call on a branch that has stiffened in its lateral position for two years. With great difficulty and with an exaggerated bend only, can it assume an upright position.

The damage is also accentuated if the pines are open grown, as in an old pasture (see Figure III), because there is no crowding to force one lateral quickly into the upright position.

With these two facts in mind it is evident that on account of the white pine weevil, planting of white pine should be restricted to the better sites and no fail spots should be allowed. Every opening in the young plantation caused by death of seedlings should be filled up, so that the cover will be as complete as possible.

Interplanting with another species practically immune to the weevil, such as Red Pine or European Larch, is to be recommended. Then if white pine is completely ruined as a timber tree by the weevil, there is still left the other species, and the white pine can still function as a nurse tree to bring the other species through.

THE OWNER WITH PINE ALREADY WEEVILED

The foregoing recommendations, of course, don't help the plantation owner who, so to speak, is already stung.

Cutting off and destroying the damaged leaders will unquestionably get rid of the year's brood in the plantation and so lessen the potential damage for another year. Since the first attack will come when the pine leaders are about four feet high (Figure I-4), it is a simple and inexpensive matter to go along with pruning shears and cut and collect the brown tips, cutting the leader back flush with the next whorl of branches (Figure I-1 and 5).

Under average conditions the weevils will attack from 10 to 20 per cent of the leaders the first year, and under such conditions recorded pruning costs are approximately fifty cents per acre. With very little extra expense, all the adjoining laterals can be cut out at the same time except the sturdiest. This will allow the strength of the tree to go into the lateral remaining. The recovery after such pruning is shown in Fig. I-1 of the accompanying picture. There is of course some risk that the remaining lateral which becomes the leader, may be hit the next year, and thus the tree get a serious setback. The surrounding unattacked leaders will be somewhat higher than the lateral leader, however, and so there is less likelihood of its being attacked than its associates. The weevils seem to attack those leaders that are on an average height level.

Such yearly procedure, as long as the leaders can be reached without ladders, has brought through good pine plantations in a region of prevalent weevil damage, in various sections of the state. After the plantation gets to be fifteen to twenty feet high, it has been noted that the weevil damage becomes less.

The larvae-infested leaders had best be destroyed forthwith. Of course,

there will be some parasites destroyed along with the weevils, but there are also hyper-parasites present which prey on the parasites, so in the generality of cases prompt burning of the infested twigs is a good practice.

Fig. III.—*Thirty year old white pine in open stand (less than 1200 trees to the acre). Crooks very pronounced.*

HAND PICKED WEEVILS

Mr. C. G. Dumond of Delaware County, N. Y., has been even more forehanded. He has gone through his plantations each spring and collected the weevils as they clustered in the terminal buds before any egg laying was done by the female. As several trips through the plantation are required instead of one as in the case of the pruning control, the expense is somewhat greater. But on the other hand, Mr. Dumond has a perfect stand of pine, not a single crook is to be found throughout the plantations.

To the owner with large areas of white pine plantations at heights most susceptible to weevil attack, and where labor is not to be had for collecting the damaged leaders, there is really not much to offer in the way of helpful suggestions.

It is well to remember, however, that whereas the plantation was started with 1,200 trees to the acre (using the usual spacing of 6 x 6 feet), there will be, fifty years hence, less than 500 trees to the acre. The soil will support no more. So even if 60 per cent of his trees are attacked by the weevil, there is still a chance of straight stems at maturity.

BY WAY OF SUMMARY

The weevil is unquestionably a serious menace to white pine plantations

Fig. II.—*Typical Mid-July appearance of a weevil-larvae-infested leader of White Pine.*

in New York State; so serious that restrictions must be set up governing the choice of planting area. It is important, too, to keep a 100 per cent stand present up to the time crown covers definitely close, 10th to 15th year.

If the site is one permitting of a rapid growth of the pine (two feet per year), the plantation will come through to make a crop of timber, in spite of the weevil, even if nothing is done in way of control, though there will undoubtedly be many crooked trees in the 50 year old stand. (See picture No. III.) If control work during the first ten critical years is conducted along the lines suggested, an appreciable reduction in amount of crook per tree is to be expected, and also a reduction in the number of leaders attacked in any one year.

OUTLOOK FOR THE FUTURE

The outlook for the future need not be considered entirely by the light of today. It should be borne in mind that this insect, unlike the Gypsy Moth, the Boll Weevil and the Japanese Beetle, to mention only a few of the more prominent recent visitors to our shores, is a native insect. As such it has been here as long as its host, the white pine. We have had splendid stands of white pine in the past with the weevil present. We can expect them again, or at least such as can be grown in seventy-five years. It is easy to account for the rapid increase and prevalence of the weevil in the last quarter of a century. Areas of abandoned land seeding up to open field pine gave abundant food and ideal conditions for this rapid increase. The millions of pine set out in plantations in the last decade

all through the Northeast have furnished even better pasturage for the weevil. Unless well-known biological laws fail in this instance, the natural enemies of the weevil (chiefly parasites) may be expected to increase gradually and thus eventually hold the weevil more closely in check. It is estimated that at the present time in many sections of New York State fully 50 per cent of the weevil larvae are killed by parasites. This percentage, however, must be increased considerably before any appreciable effect in checking the weevil can take place.

In the meantime, spring collecting of the adults, or pruning measures in thrifty young plantations in the summer, will insure better shaped trees, and reduce the number of weevils in that locality.

Apple Tree Has Not Bloomed in 30 Years

I have an apple tree that was bought from a nursery 30 or 35 years ago, and so far as I can tell it has never had a single blossom on it. It is a big, thrifty tree. What can I do to make it bear? J. N. H.

IT is not common to find a tree that never blossoms even slightly, yet it is entirely possible that a tree might react that way. You are familiar with the sickly or injured tree which blooms profusely for a year or two and then dies. This condition is due to the higher proportion of carbohydrate materials built up in the leaves of the tree as compared with a reduced supply of nitrate materials because of injury to roots or trunk or branches. On the other hand, a tree may be in just the opposite condition, wherein it is so liberally supplied with nitrates from the soil that the tree is "over-vegetative" and so produces no blossoms. The remedy is to reduce the supply of materials from the roots, the simplest of which is "ringing," in which a strip of bark is removed completely around the trunk or around the limbs. It must be understood at once that this practice is only to be used as a last resort, because it is not performed without at least some degree of hazard, and it should never be employed year after year on the same tree.

Ringing is accomplished by removing a strip of bark of the desired width from the member that is to be treated. A strip two or three inches wide is plenty wide enough, and often merely running the knife around the trunk or limb without removing any bark is sufficient to throw a tree into bearing. You might try the method on one limb and see the effect before treating the entire tree in this way.

There is another angle to the matter, however. A variety of subspecies of apple is not uncommon, which is known as "bloomless." It is not strictly "bloomless," yet to the average observer it appears without flowers because the flowers have no showy petals. Bees and insects not being attracted by show of flower or by the possible supply of nectar, do not effect cross-fertilization, and so fruit is seldom brought to maturity. In Europe children take blossoms from other trees and toss them into the "bloomless" tree. Perhaps they do not know why they do it, but they are helping the tree to set fruit.

H. B. TUKEY, *Rural New Yorker.*

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY

RIVERTON, N. J.

June 25, 1927.

F. A. BARTLETT TREE EXPERT CO.,
Harrison Building,
Philadelphia, Pa.

Dear Sir:

In reply to your letter of June 17, I would state that the United States Department of Agriculture is cooperating with the State Departments of Agriculture of New Jersey, Pennsylvania, Delaware, New York and Connecticut on the control and prevention of spread of the Japanese Beetle.

The adult beetle usually appears about the middle of June, and is present during June. July, August, September and October. During that time it feeds on many species of economic plants, principally on the foliage and fruit of apples, peaches, cherries and grapes, and on many types of ornamental trees and shrubs. During the summer an adult beetle lays its eggs in the soil, which hatch into tiny larvae. These feed throughout the autumn and reach a length of approximately one inch by November, when feeding ceases and they descend deeper into the soil where they pass the winter in a quiescent condition. In the spring the feeding is resumed and the larvae pupate early in May, the adult beetles emerging from the pupae during June and July.

For the protection of apples, grapes and cherries we are recommending the use of three tablespoonsful of lead arsenate, two tablespoonsful of flour to one gallon of water. This is at the rate of approximately three pounds of arsenate of lead and two pounds of flour to fifty gallons of water. The lead arsenate and flour are made into a thin paste and diluted with the required amount of water. The beetles feed on both the upper and lower sides of the leaf and the spray should be directed to completely cover both surfaces of the leaf. Do not wait until the beetles are present before applying this spray, but protect the foliage by spraying on or about June 25, regardless of whether the beetles are present on the foliage or not. If heavy rains wash the spray off the plants, it may be necessary to repeat the application. Thoroughness in applying the sprays so that all portions of the foliage are covered is of the utmost impor-- tance. Do not apply poisons to any fruits as they are approaching the ripening period.

To protect shade trees such as Elm, Linden, etc., shrubs and perennial plants, it has been found that coated lead arsenate, used at the rate of one tablespoonful to one gallon of water is sufficient. This material is a paste and quite heavy, so that this amount will be at the approximate rate of 4 pounds of the coated lead arsenate to 50 gallons of water. This material may be purchased in local stores in and around Philadelphia.

In case it is desired to use a spray which will kill the beetles upon contact with it, we advise the use of a pyrethrum soap which has been recently developed at the Japanese Beetle Laboratory. This material is being manufactured and sold by a number of firms. This material to be effective, it is of course necessary for the bettles to be present. Most effective results are secured when spraying is done during the hot part of the day when the beetles are active. In order to kill the beetles, the spray must be applied directly to them. We recommend the use of this material only in cases where heavy infestations of the Japanese beetle are present.

Very truly yours,

(Signed) LOREN B. SMITH,
Entomologist in Charge,

Preventing Spread of Japanese and Asiatic Beetles.

Timely Hints

Cut out the cankered areas in your trees now.

Have the cavities in your trees treated.

Wounds in trees should be covered to prevent the entrance of fungus spores.

Watch shade trees, especially Elms, for the work of the Leopard Moth.

Dig out the Sugar Maple Borer and Carpenter Worm.

If you have not fertilized your trees, do so now that they may receive the benefit of the fertilizer during their growing season.

Cut out and burn dying Hickory trees for they are the breeding place for the Hickory Bark Beetle.

Cut out and burn dying Oak trees for they too are the breeding place of the Two-lined Chestnut Borer.

The ravages of the Bronze Birch Borer may be retarded by fertilizing your Birch trees and applying plenty of water.

Water and plant food will keep your trees in a healthy and vigorous condition.

Cut away dead and dying branches for they spread diseases and insects.

Protect your big trees and your feature trees from lightning. TREE TALK will be glad to supply up-to-date information on this subject.

Brace all trees which show a tendency to split down.

Do not allow cement to be put in your trees. There are other materials far more effective.

Do not neglect the cavities in your trees. Each year they grow larger and the structure of your trees becomes weaker and weaker.

Open cavities are but a make-shift, and never prove effective. Have them filled with an antiseptic filler which will arrest decay and exclude water and air.

Black-Cup Fungus of Oaks

SEVERAL oak trees showing masses of a black-cup fungus belonging to the genus Bulgaria have been observed on Long Island and in New Jersey this season. The fungus involved is very likely *Bulgaria polymorpha Wett.* No investigations have been made in this country on the parasitism of this fungus. In the cases observed and from reports of others, it seems probable that this fungus frequently is the cause of the death of oaks. The number of cases recently observed have caused alarm, and a study of the fungus and methods of treating the cankers have been begun by the Research Department of the Bartlett Tree Expert Company.

Bulgaria polymorpha is a common saprophyte on recently felled oak and beech in Europe. A few brief statements by European writers attest to the fact that oak trees have been killed apparently by this fungus. In the absence of any experimental work these statements are no more conclusive than recent observations made in this country. It has been stated from observation, however, that this fungus is considered a true parasite of oaks, and cases are cited of trees killed by it in England, Germany and Austria. In one instance a red oak in Berlin, Germany, girdled by one-half of its circumference was treated by excavating the affected bark and wood. The tree died that year and the fungus fruited abundantly from the previously healthy bark for a distance of four or five feet up the trunk. A careful examination of this tree failed to determine any other possible cause of death than the girdling action of the Bulgaria fungus.

The black-cup fungus seems to be confined to the base of the trunk and the exposed roots. The details regarding the tissues invaded and progress of the mycelium remain to be studied. It seems to spread around the tree most rapidly at the ground line and usually extends up the trunk for only one or two feet. There is no outward indication of bark destruction until the fruiting-bodies break through in the bark crevices. The fungus seems to fruit abundantly where it is active, and the fruiting-bodies remain intact for several weeks. They are rather peculiar in that they are black and are the consistency of rubber when moist. They break through in the bark crevices and grow to the size of one-quarter to one-half inch across. The outer surface, when they are moist, is flat or slightly cup-shaped. The fruiting-bodies are thick and taper to a short stalk where they emerge from the bark. The spores are borne in the flat surface of the fruiting-body and are shot forcibly into the air.

The possibilities of the successful treatment of affected trees will depend upon the results of the investigations to be made. If it should prove to be a wound parasite, prevention of infection might be accomplished by the precautionary treatment of wounds at the base of oak trees. A study of the effect of the mycelium on the bark and wood tissues will determine the extent to which the cankers must be excavated and traced. The extent to which the fungus invades the roots below the ground line must be determined in order to continue the tracing of the canker so that it is completely circumscribed. Usually such cankers as this appears to be, are amenable to treatment after methods of determining the exact extent of the canker have been worked out.

W. Howard Rankin.

A Pleasant Day with the Bartlett Methods

By George A. Cromie,
City Forester of New Haven, Conn.

FOR many years as City Forester of New Haven I have been keenly interested in the work and efforts of the F. A. Bartlett Tree Expert Company in placing shade tree care on a basis of real scientific research rather than on past rules-of-thumb. So when the genial Vice-President and District Manager, Orville W. Spicer, invited me to a real peep into the inner secrets of the organization with a chance to look at scenery without my hands on a steering wheel I just couldn't refuse.

From the train we went to the home plant of the Company within a stone's throw of Stamford's center with its dizzy flow of shore traffic to and from New York. First, the office, where 15 girls were busy ticking off names on a mysterious and rapid addressing machine, bringing in and answering inquiries from customers, filing data, and smoothing the details of work being done by a keen and far-reaching field force. Next the school, where Professor T. H. Reuman was setting up exhibits, models and materials for the next class of student workers to do their initial study and blundering. Some lantern slides showing 50 pictures of tree work, insects, and treatment, on a small film the size of a roll of adhesive tape interested me very much. In Stamford too was the factory where men and mixers were compounding the materials for "NuwuD" cavity filler, Bartlett "Green Tree Food", and the various chemicals used in spraying. Here also were toolrooms, power sprayers, electric drills and chisels, and threaded iron rod and cable guys to be used in fastening split trees instead of the old bolt and chain methods.

A difficult NuwuD filling that is standing the test of time.

Next we went to see actual field work and at some of the lovely seashore places of Greenwich there are clients who must be well satisfied for they have given the firm entire charge of their trees for many successive years. Among the exhibits were at least 20 treated trees on the estate of John D. Chapman and one magnificent large Red Oak rejuvenated by "Tree Food" on the front lawn of D. Graham Smythe of Greenwich, Conn. Nothing could be concealed; there were the first crude fillings without the "Heal Collar" side by

side with the latest improved technique. All showed real value and improved health to the trees treated.

So we turned and twisted through the country estates of Greenwich and Westchester County to the experiments and laboratory situated on the scenic home grounds and 35 acre woodland of Mr. F. A. Bartlett in North Stamford.

Mr. Bartlett has in no way confined his hobbies to tree surgery, for the first area we visited was covered with nut trees—hardy varieties of Pecans, Shagbarks, Filberts, Chinese Chestnuts, Japanese Chestnuts, even Fruiting American Chestnuts, Chinquapins, the Heart Nut and Almonds; some of them ideal shade trees; some loaded with edible nuts; also Persimmons, groups of high bush Blueberries, and many others that were new.

In the Laboratory were the test tubes, photos and data taken by Dr. W. H. Rankin and Mr. Rush Marshall showing results of the experiments which we saw later in the woodland. In the back yard were the poor victim trees on which Mr. Bartlett had for years tried out every method, preparation and idea of which his staff could conceive, or put on the market by other firms.

And lastly, to the field area nearby where are the most modern and scientific researches into the "whys" of tree life it has been my pleasure to visit. In a rocky woodland were hundreds of trees of 50 different named varieties. In some of them were "NuwuD" fillings, in others concrete and various materials. In many, several kinds of fillings were used side by side for comparison or the same cavity would contain several fillings one above the other or in perpendicular strips. Behind many fillings were inoculations of fungus-infected wood made to note progress of decay; in others were devices for measuring cambium growth, leakage of slime flux, contact of wood to filler and impregnation of salts and wood preservatives. We bored holes right through NuwuD fillings into the heartwood of the tree. As this filling is proprietary I will not make comparisons but will say that tree owners are justified in using and will receive real value in NuwuD cavity fillings.

Then to a wonderful peep into the inner life of trees. For in this section of the woodland were dozens of Oaks, Elms, Birches and Tupelo bored half way, or through and through, with holes in which were inserted glass windows hermetically sealed so that we could see what was going on; the collection of sap during rainy spells; the drying of tissue in hot weather; the variance of action from night to day; and between different species; and the directional flow of sap and the progress of wound healing.

In the heart of the woods I met several of the Bartlett District Managers on a visit to inspect the results of their latest research, all good fellows, all optimistic, and every word expression showing vital interest in the technical side of their work as well as in the business end by which they kept their families happy and humming. We rode to town together, some taking the train towards Philadelphia, others scattering to Albany or wherever else this progressive Company has one of its agencies. Good luck to them! May many more such branches of Bartlett's continue to preserve the forest or roadside monarchs that all too fast give way to gas, electricity, impervious pavements, and the other modern home and transit conveniences we demand at the expense of tree vigor and life!

Blight of Red Cedars

Injury to red cedar by the cedar blight organism has been quite evident in Connecticut during the past summer. The extreme wetness of the season may account for the evidence of the disease in two ways:

1. Wet conditions have favored the production of the fruiting bodies and the spread of the fungus.

2. They have made evident to even a casual observer that the burned, scorched appearance of the parts attacked cannot this year be attributed to drought.

The disease is caused by Phomopsis, one of the smaller fungi belonging to the so-called "imperfect group". Its attack on the red cedar produces a burned appearance of the parts affected and the small dark-colored fruiting body may often be observed. Under ordinary conditions the fungus is but weakly parasitic working most of its injury to young trees in the nursery row, or to heavily shaded branches. When conditions become more favorable to its spread, as they have during the past season, injury to the red cedar is often increased, and other closely related trees are sometimes attacked.

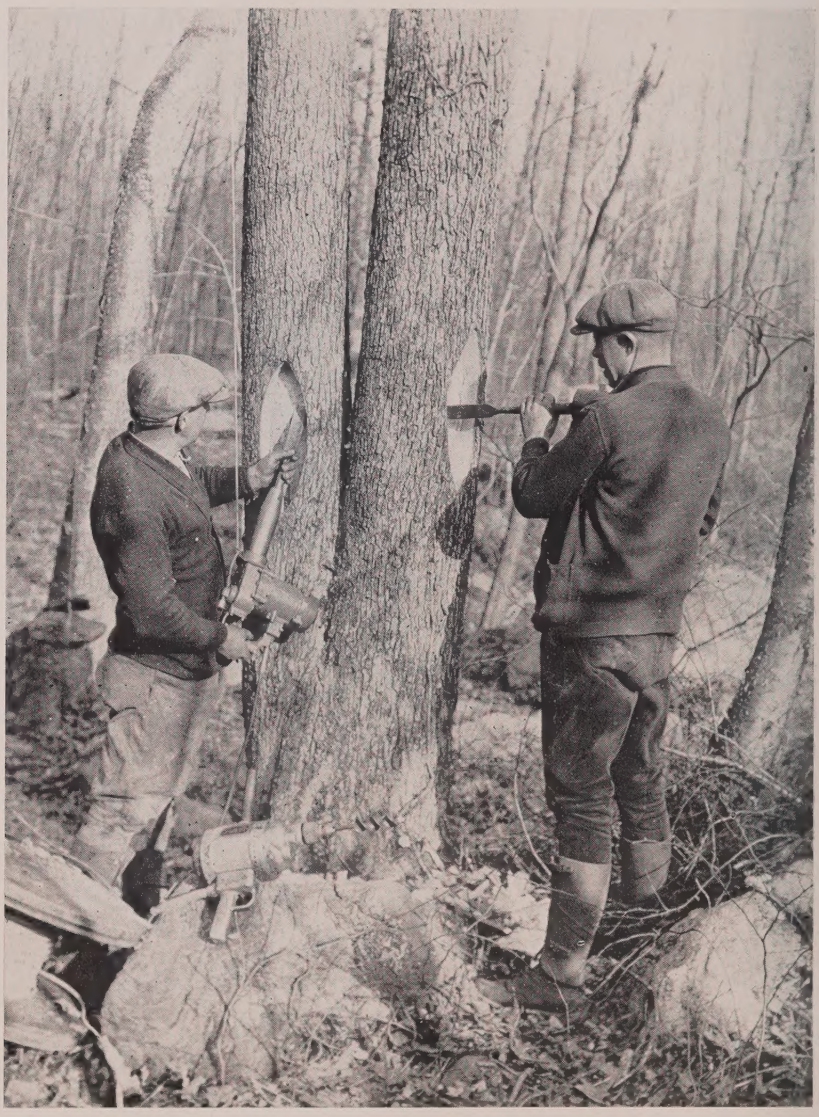
The office of Forest Pathology of the United States Department of Agriculture is making a careful study of the disease and its control.

PRUNING PEACHES

Peaches bear on one year old wood, that is, the peaches which are to be harvested next summer and fall will develop on the wood which grew during the season of 1927. Consequently we prune rather heavily each year to induce good vigorous new wood. A peach tree naturally sets more peaches than it can develop to large size, so in pruning, we remove considerable of the bearing wood, reduce the number of fruit buds, with the result that with a greatly reduced number of fruit buds, we expect larger sized fruit at the harvest.

If you value your fruit trees, and who is there who does not, do not allow workmen to climb about your tree with hob-nailed or stiff soled shoes. The bark will be broken, and thus an opening will be formed for canker and other fungus diseases to enter. Have the workmen remove the brush carefully from the tree and damage the fruit spurs and buds as little as possible. A fruit spur once broken will never be replaced.

Regarding the time of pruning—the work can be safely done during the late fall, winter and early spring. The very best time would be early spring before the sap begins to flow freely, but as this is not always possible, for all practical purposes the work can be done at the time specified above.



In a contest between hand tools and power tools here depicted, the hand tools were left decidedly in the rear, the power tools doing the work one-third to one-half quicker and with less apparent effort on the part of the man.

GOOD BOOKS ABOUT TREES

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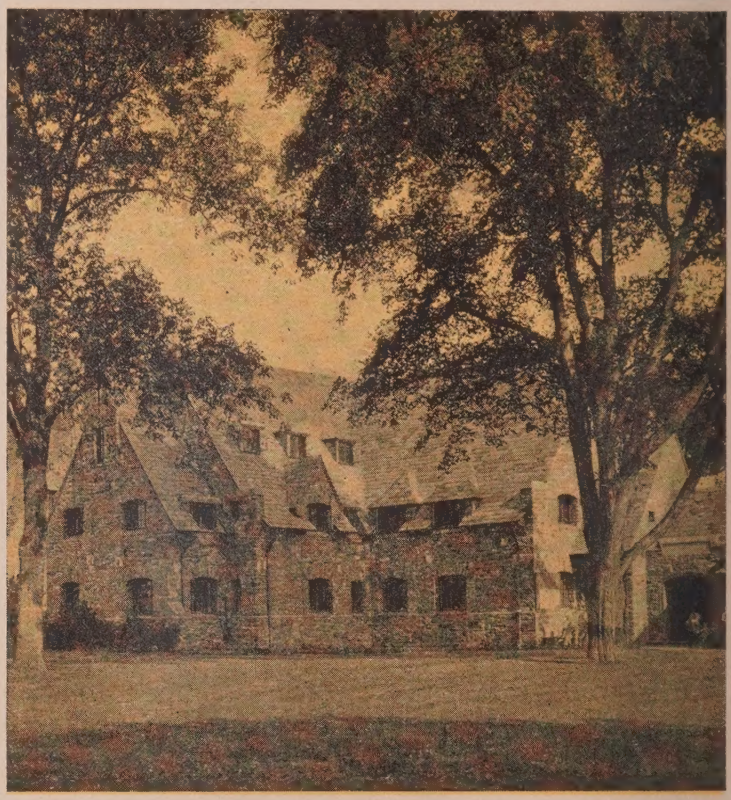

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